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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/534,125 | 11/18/2005 | Thorsten Mayer | R.304250 | 8479 |
| 2119 | 7590 | 05/17/2006 | EXAMINER | |
| RONALD E. GREIGG GREIGG & GREIGG P.L.L.C. 1423 POWHATAN STREET, UNIT ONE ALEXANDRIA, VA 22314 | | | | NGUYEN, TU MINH |
| | | ART UNIT | | PAPER NUMBER |
| | | 3748 | | |

DATE MAILED: 05/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | |
|------------------------------|------------------------|---------------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 10/534,125 | MAYER ET AL. |
| | Examiner | Art Unit |
| | Tu M. Nguyen | 3748 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 06 May 2005.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 11-30 is/are pending in the application.
 - 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 11-30 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 06 May 2005 is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 111805.
- 4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: _____.

DETAILED ACTION

1. An Applicant's Preliminary Amendment filed on May 6, 2005 has been entered. Claims 1-10 have been canceled. Claims 11-30 have been added and are pending in this application.

Drawings

2. The drawings filed on May 6, 2005 are acceptable subject to correction of the informalities indicated on the attached "Notice of Draftsperson's Patent Drawing Review," PTO-948. In order to avoid abandonment of this application, correction is required in reply to the Office action. The correction will not be held in abeyance.

Claim Objections

3. Claims 11, 17-20, 29, and 30 are objected to because of the following informalities:
 - Claim 11, line 8 of the claim, "can be delivered" should be deleted.
 - Claims 17-20, line 3 of each claim, "can be" should read --is-- because the phrase "can be" is indefinite.
 - Claim 29, line 2 of the claim, "can be" should read --is--.
 - Claim 30, lines 2, 3, and 7 of the claim, "can be" should read --is--Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office Action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 11, 29, and 30 are rejected under 35 U.S.C. 102(b) as being anticipated by Berriman et al. (U.S. Patent 5,992,141).

Re claims 11 and 30, as shown in Figures 1, 2, 3, and 8, Berriman et al. disclose a method and an apparatus for post-treatment of the exhaust gas of an internal combustion engine (12), in which nitric oxides contained in the exhaust gas are selectively catalytically reduced, the method comprising:

- delivering a first auxiliary agent (ammonia) from a supply (32) thereof to the exhaust gas;
- subjecting a portion of the first auxiliary agent (ammonia) at least intermittently to a chemical conversion into a second auxiliary agent (NH₂ or NH);
- storing the second auxiliary agent in an intermediate reservoir (140); and
- at least intermittently, delivering the second auxiliary agent to the exhaust gas parallel to the first auxiliary agent (see lines 4-28 of column 5).

Re claim 29, in the method of Berriman et al., the intermediate reservoir (140), for being heated or for expelling the second auxiliary agent, is intermittently subjected to exhaust gas.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 11-20 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krutzsch et al. (U.S. Patent 5,921,076) in view of Akama et al. (U.S. Patent Application 2002/0038542).

Re claims 11 and 30, as depicted in Figure 1, Krutzsch et al. disclose a method and an apparatus for post-treatment of the exhaust gas of an internal combustion engine (1), in which nitric oxides contained in the exhaust gas are selectively catalytically reduced, the method comprising:

- delivering a first auxiliary agent (HC) from a supply (5) thereof to the exhaust gas;
- subjecting an hydrogen producing fluid (water, methanol, HC) at least intermittently to a chemical conversion (in hydrogen generator (6)) into a second auxiliary agent (hydrogen) (see lines 56-60 of column 2);
- storing the second auxiliary agent in an intermediate reservoir (6) (lines 56-60 of column 2); and
- at least intermittently, delivering the second auxiliary agent to the exhaust gas parallel to or in alternation with the first auxiliary agent (see lines 11-30 of column 3 and Figures 3-4).

Krutzsch et al., however, fail to disclose that the HC generator (5) is incorporated with the hydrogen generator (6).

As shown in Figure 1, Akama et al. teach that it is conventional in the art to incorporate a hydrogen generator (10) with a fuel tank (7) so that a fuel from the fuel tank is reformed with a carrier gas (exhaust gas) in the hydrogen generator to produce a hydrogen-containing gas for injection into an exhaust gas stream to remove NOx at a NOx reducing catalyst (6). It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the teaching by Akama et al. in the method and apparatus of Krutzsch et al., since the use thereof would have been routinely utilized by those with ordinary skill in the art to reduce complexity in an exhaust gas system.

Re claims 12-13, in the modified method of Krutzsch et al., in a so-called normal operating mode of the engine, a delivery of the first auxiliary agent exclusively is effected, and wherein at selected time intervals outside the normal operating mode, in particular during a cold-starting phase of the engine, a delivery of the second auxiliary agent exclusively is effected (lines 12-17 of column 4), wherein the chemical conversion is effected during the normal operating mode (generator (6) is also used for storing hydrogen).

Re claims 14-16, in the modified method of Krutzsch et al., it is obvious that the chemical conversion is performed only until such time as the intermediate reservoir is full.

Re claims 17-20, in the modified method of Krutzsch et al., it is also obvious that in order to save space and cost, the volume of the intermediate reservoir is dimensioned such that a quantity of second auxiliary agent that meets the demand for the second auxiliary agent during a cold-starting phase of the engine is stored.

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8. Claims 21, 24; 22, 25; and 23, 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krutzsch et al. in view of Akama et al. as applied to claims 11; 12; and 13, respectively, above, and further in view of design choice.

In the modified method of Krutzsch et al., the first auxiliary agent is HC and the second auxiliary agent is ammonia. Thus, they fail to disclose that the first auxiliary agent is a substance that releases ammonia at sufficiently high temperatures and the second auxiliary agent is ammonia.

Reducing agents for use in internal combustion engines can take the form of many different compounds such as hydrogen, diesel fuel, urea, etc. One having ordinary skill in the art would have selected the specific compound based on available resources. For example, the reducing fluid for a NO_x catalyst with a diesel engine would normally be diesel fuel because diesel fuel would be readily accessible. In gasoline engines, one having ordinary skill in the art would have selected any of the known reducing agents based on necessity, since gasoline engines normally would not have diesel fuel on board. One of the other fluids mentioned above such as urea would have to be selected for a gasoline engine. Therefore, with regard to applicants claim directed to a specified auxiliary agent, the specification of such would have been an obvious matter of design choice well within the level of ordinary skill in the art depending on design variables, such as a type of the engine (i.e., for a diesel engine, a system that has HC and hydrogen is used. On the other hand, for a gasoline engine, a system that has urea and ammonia is used). Moreover, there is nothing in the record which establishes that the specification of such presents a novel or unexpected result (See *In re Kuhle*, 526 F.2d 553, 188 USPQ 7 (CCPA 1975)).

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9. Claims 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krutzsch et al. in view of Akama et al. as applied to claims 11 and 12, respectively, above, and further in view of design choice and Kinugasa et al. (U.S. Patent 6,109,024).

The modified method of Krutzsch et al. discloses the invention as cited above, however, fails to disclose that the first auxiliary agent is a substance that releases ammonia and the second auxiliary agent is ammonia; and that a zeolite body or a salt that forms an ammonia complex is used as the intermediate reservoir.

Reducing agents for use in internal combustion engines can take the form of many different compounds such as hydrogen, diesel fuel, urea, etc. One having ordinary skill in the art would have selected the specific compound based on available resources. For example, the reducing fluid for a NO_x catalyst with a diesel engine would normally be diesel fuel because diesel fuel would be readily accessible. In gasoline engines, one having ordinary skill in the art would have selected any of the known reducing agents based on necessity, since gasoline engines normally would not have diesel fuel on board. One of the other fluids mentioned above such as urea would have to be selected for a gasoline engine. Therefore, with regard to applicants claim directed to a specified auxiliary agent, the specification of such would have been an obvious matter of design choice well within the level of ordinary skill in the art depending on design variables, such as a type of the engine (i.e., for a diesel engine, a system that has HC and hydrogen is used. On the other hand, for a gasoline engine, a system that has urea and ammonia is used). Moreover, there is nothing in the record which establishes that the specification of such presents a novel or unexpected result (See *In re Kuhle*, 526 F.2d 553, 188 USPQ 7 (CCPA 1975)).

As shown in Figure 1, Kinugasa et al. disclose an exhaust gas after-treatment device comprising an ammonia adsorbing-denitrating catalyst (9). As indicated on lines 31-39 of column 10, they teach that it is conventional in the art to utilize a zeolite body as a component in the ammonia adsorbing-denitrating catalyst (9) to adsorb ammonia. It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the teaching by Kinugasa et al. in the modified method of Krutzsch et al., since the use thereof would have been routinely utilized by those with ordinary skill in the art to store ammonia for a future use.

Prior Art

10. The IDS (PTO-1449) filed on November 18, 2005 has been considered. An initialized copy is attached hereto.

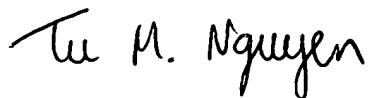
11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure and consists of four patents: Murphy et al. (U.S. Patent 6,122,909), Mulligan (U.S. Patent 6,739,125), Breuer et al. (U.S. Patent 6,871,491), and Buglass et al. (U.S. Patent 6,895,746) further disclose a state of the art.

Communication

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Tu Nguyen whose telephone number is (571) 272-4862.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Thomas E. Denion, can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



TMN

Tu M. Nguyen

May 12, 2006

Primary Examiner

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